

In re Patent Application of:
STORM ET AL.
Serial No. 10/820,464
Filed: **APRIL 8, 2004**
Confirmation No. 7257

In the Claims:

Claims 1-13 (Cancelled).

14. (Currently Amended) An image sensor comprising:
an array of pixels, each pixel comprising
a photodiode,
a first output circuit for deriving a linear output
signal by applying a reset signal to said photodiode and reading
a voltage on said photodiode after an integration time,
a second output circuit for deriving a logarithmic
output signal by reading a near instantaneous illumination-
dependent voltage on said photodiode that is a logarithmic
function of the illumination,
said first and second output circuits sequentially
providing the linear and logarithmic output signals,
and
an output selection circuit for selecting between
the linear output signal and the logarithmic output
signal as an output signal, ~~with the linear output
signal being selected when greater than a predetermined
value.~~

15. (Previously Presented) The image sensor according
to Claim 14, wherein said first output circuit comprises:
a reset switch for applying a reset voltage to said
photodiode, said reset switch comprising a reset transistor
including a conducting terminal connected to said photodiode; and
a readout switch for turning on the conducting terminal
of said reset transistor after expiration of the integration
time.

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16. (Previously Presented) The image sensor according to Claim 14, wherein said second output circuit comprises:
an amplifier; and
a log select switch for connecting said amplifier to said photodiode.

17. (Previously Presented) The image sensor according to Claim 16, wherein said amplifier comprises a differential amplifier having an inverting input connected to the conducting terminal of said reset transistor, and a non-inverting input connected to a reference voltage.

18. (Previously Presented) The image sensor according to Claim 14, further comprising a calibration circuit for calibrating each pixel before deriving the logarithmic output signal.

19. (Previously Presented) The image sensor according to Claim 18, wherein said calibrating circuit comprises a constant current source selectively connected to each respective pixel.

20. (Previously Presented) The image sensor according to claim 19, wherein an output node is associated with each photodiode, and wherein the linear and logarithmic output signals are derived from the output node, said calibration circuit further comprising a switch connected between said photodiode and the output node for isolating said photodiode from the output node while calibration takes place.

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21. (Currently Amended) An image sensor comprising:
an array of pixels, each pixel comprising

a photodiode,

a first output circuit connected to said
photodiode for generating an output signal to be a
linear output signal,

a second output circuit connected to said
photodiode for generating the output signal to be a
logarithmic output signal,

said first and second output circuits
sequentially providing the linear and logarithmic
output signals, and

an output selection circuit for selecting
between the linear output signal and the logarithmic
output signal as the output signal, ~~with the linear
output signal being selected when greater than a
predetermined value.~~

22. (Previously Presented) The image sensor according
to Claim 21, wherein the linear output signal is selected if the
pixel has not saturated during generation of the linear output
signal, otherwise, the logarithmic output signal is selected.

23. (Previously Presented) The image sensor according
to Claim 21, wherein said first output circuit derives the linear
output signal by applying a reset signal to said photodiode and
reading a voltage on said photodiode after an integration time.

24. (Previously Presented) The image sensor according
to Claim 21, wherein said second output circuit derives a

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logarithmic output signal by reading a near instantaneous illumination-dependent voltage on the photodiode that is a logarithmic function of the illumination.

25. (Previously Presented) The image sensor according to Claim 21, wherein said first output circuit comprises:

a reset switch for applying a reset voltage to said photodiode, said reset switch comprising a reset transistor including a conducting terminal connected to said photodiode; and
a readout switch for turning on the conducting terminal of said reset transistor after expiration of the integration time.

26. (Previously Presented) The image sensor according to Claim 21, wherein said second output circuit comprises:

an amplifier; and
a log select switch for connecting said amplifier to said photodiode.

27. (Previously Presented) The image sensor according to Claim 26, wherein said amplifier comprises a differential amplifier having an inverting input connected to the conducting terminal of said reset transistor, and a non-inverting input connected to a reference voltage.

28. (Previously Presented) The image sensor according to Claim 21, further comprising a calibration circuit for calibrating each pixel before deriving the logarithmic output signal.

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29. (Previously Presented) The image sensor according to Claim 28, wherein said calibrating circuit comprises a constant current source selectively connected to each respective pixel.

30. (Previously Presented) The image sensor according to Claim 29, wherein an output node is associated with each photodiode, and wherein the linear and logarithmic output signals are derived from the output node, said calibration circuit further comprising a switch connected between said photodiode and the output node for isolating said photodiode from the output node while calibration takes place.

31. (Currently Amended) A method for operating an image sensor comprising an array of pixels, each pixel comprising a photodiode, the method comprising:

deriving a linear output signal from each pixel;

deriving a logarithmic output signal from each pixel,

with the linear and logarithmic output signals being sequentially derived; and

selecting between the linear output signal and the logarithmic output signal as an output signal, ~~with the linear output signal being selected when greater than a predetermined value.~~

32. (Previously Presented) The method according to Claim 31, wherein deriving the linear output signal from each pixel comprises:

applying a reset voltage to the photodiode;

allowing for a predetermined integration time; and

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reading an output voltage on the photodiode.

33. (Previously Presented) The method according to Claim 31, wherein deriving the logarithmic output signal is based upon reading a near instantaneous illumination-dependent voltage on the photodiode that is a logarithmic function of the illumination.

34. (Previously Presented) The method according to Claim 31, further comprising calibrating each pixel before generating the corresponding logarithmic output signal.

35. (Previously Presented) The method according to Claim 34, wherein each pixel is calibrated by applying a constant current thereto.

36. (Previously Presented) The method according to Claim 35, wherein an output node is associated with each photodiode, and wherein the linear and logarithmic outputs are generated with respect to the output node, and a calibration circuit comprising a switch is connected between the photodiode and the output node for isolating the photodiode from the output node while calibration takes place.